

FCC VERIFICATION TEST REPORT

REPORT NO.: FV130729D02

MODEL NO.: P703, P703(C), MultiSync P703

RECEIVED: Jul. 29, 2013

TESTED: Aug. 1 ~ 13, 2013

ISSUED: Aug. 20, 2013

APPLICANT: TOP VICTORY ELECTRONICS (TAIWAN) CO., LTD.

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ISSUED BY: Bureau Veritas Consumer Products Services (H.K.) Ltd.,
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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
FV130729D02	Original release	Aug. 20, 2013

1 CERTIFICATION

PRODUCT: LCD Monitor
BRAND NAME: NEC
MODEL NO.: P703, P703(C), MultiSync P703
APPLICANT: TOP VICTORY ELECTRONICS (TAIWAN) CO., LTD.
TEST SAMPLE: ENGINEERING SAMPLE
TESTED: Aug. 1 ~ 13, 2013
STANDARDS: FCC Part 15, Subpart B, Class A
ICES-003: 2012 Issue 5, Class A
ANSI C63.4-2009

The above equipment (model no.: P703) has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

PREPARED BY : Albee Chu, **DATE:** Aug. 20, 2013
(Albee Chu / Specialist)

APPROVED BY : Kenny Meng, **DATE:** Aug. 20, 2013
(Kenny Meng / Assistant Manager)

2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

Standard	Test Type	Result	Remarks
FCC Part 15, Subpart B, Class A	Conducted Test	PASS	Meets Class A Limit Minimum passing margin is –22.18 dB at 5.08203 MHz
ICES-003: 2012 Issue 5, Class A	Radiated Test (30MHz ~ 6GHz)	PASS	Meets Class A Limit Minimum passing margin is –6.11 dB at 100.65 MHz

2.1 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

MEASUREMENT	FREQUENCY	UNCERTAINTY
Conducted emissions	150kHz ~ 30MHz	+/- 3.43 dB
Radiated emissions	30MHz ~ 1GHz	+/- 3.78 dB
	Above 1GHz	+/- 3.36 dB

The listed uncertainties are the worst case uncertainty for the entire range of measurement. Please note that the uncertainty values are provided for informational purposes only and are not used in determining the PASS/FAIL results.

3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	LCD Monitor
MODEL NO.	P703, P703(C), MultiSync P703
POWER SUPPLY	Internal Switching Power Supply Rating: 100-240V, 50/60Hz Power Cord: Non-shielded AC 3-pin (3.0m).
DATA CABLE SUPPLIED	Shielded D-Sub cable (4.0m) with two ferrite cores

NOTE:

1. The EUT is a LCD Monitor and the resolution is up to 1920 x 1080 (60Hz).
2. The EUT has several models, which are identical to each other except for marketing differences only, as the following:

Model No.	Interfaces	Difference
P703	◆ D-Sub in ◆ DVI in ◆ Display in	Marketing differences
P703(C)	◆ RS232 ◆ Audio in x 2 ◆ USB ◆ Display out ◆ Remote in ◆ HDMI in ◆ Audio out	
MultiSync P703	◆ LAN (10/100Mbps) x 2 ◆ External speaker terminal	
Accessory		
Speaker (NEC/ SP-RM1)		
IR (NEC/ KT-RC2)		
Remote control (NEC/ RU-M117, NEC/ RU-M121)		

During the test, **model no.: P703** was selected as the representative one and therefore only its test data was recorded in this report.

3. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

3.2 DESCRIPTION OF TEST MODES

1. The EUT is designed with AC power supply of 100-240Vac, 50/60Hz.
For radiated emission evaluation, 230Vac/50Hz (for EN 55022 & AS/NZS CISPR 22), 120Vac/60Hz (for FCC Part 15), 110Vac/60Hz & 220Vac/60Hz (for BSMI CNS 13438), 100V/ 50Hz (for VCCI) had been covered during the pre-test.
The worst radiated emission data was founded at **110Vac/60Hz** and recorded in the applied test report.
2. The EUT was pre-tested under the following resolution & refresh rate modes:

Description		Pre-tested Mode									
		1	2	3	4	5	6	7	8	9	10
Interface	Display	V					V	V	V	V	V
	DVI		V								
	HDMI			V							
	D-Sub				V						
	HDMI to DVD					V					
Function	Normal mode	V	V	V	V	V	V	V	V		
	PIP mode									V	
	POP mode										V
Resolution	1920 x 1080 (60Hz)	V	V	V	V		V			V	V
	1280 x 1024 (75Hz)							V			
	640 x 480 (60Hz)								V		
	1080p					V					
Monitor's Angle	Horizontal	V	V	V	V	V		V	V	V	V
	Vertical						V				

The worst emission level was found under **Mode 1**.

3. According as per pre-test result and client's requirement, the final test modes were as the following:

Test Item	Test Mode	Interface/ Resolution	Monitor's Angle	Input Power
Conducted Test	Mode 1	Display, 1920 x 1080 (60Hz)	Horizontal	120Vac/60Hz
	Mode 2	HDMI to DVD, 1080p	Horizontal	
Radiated Test	Mode 1	Display, 1920 x 1080 (60Hz)	Horizontal	110Vac/60Hz
	Mode 2	HDMI to DVD, 1080p	Horizontal	

All above test modes were recorded in this report.

3.3 DESCRIPTION OF SUPPORT UNITS

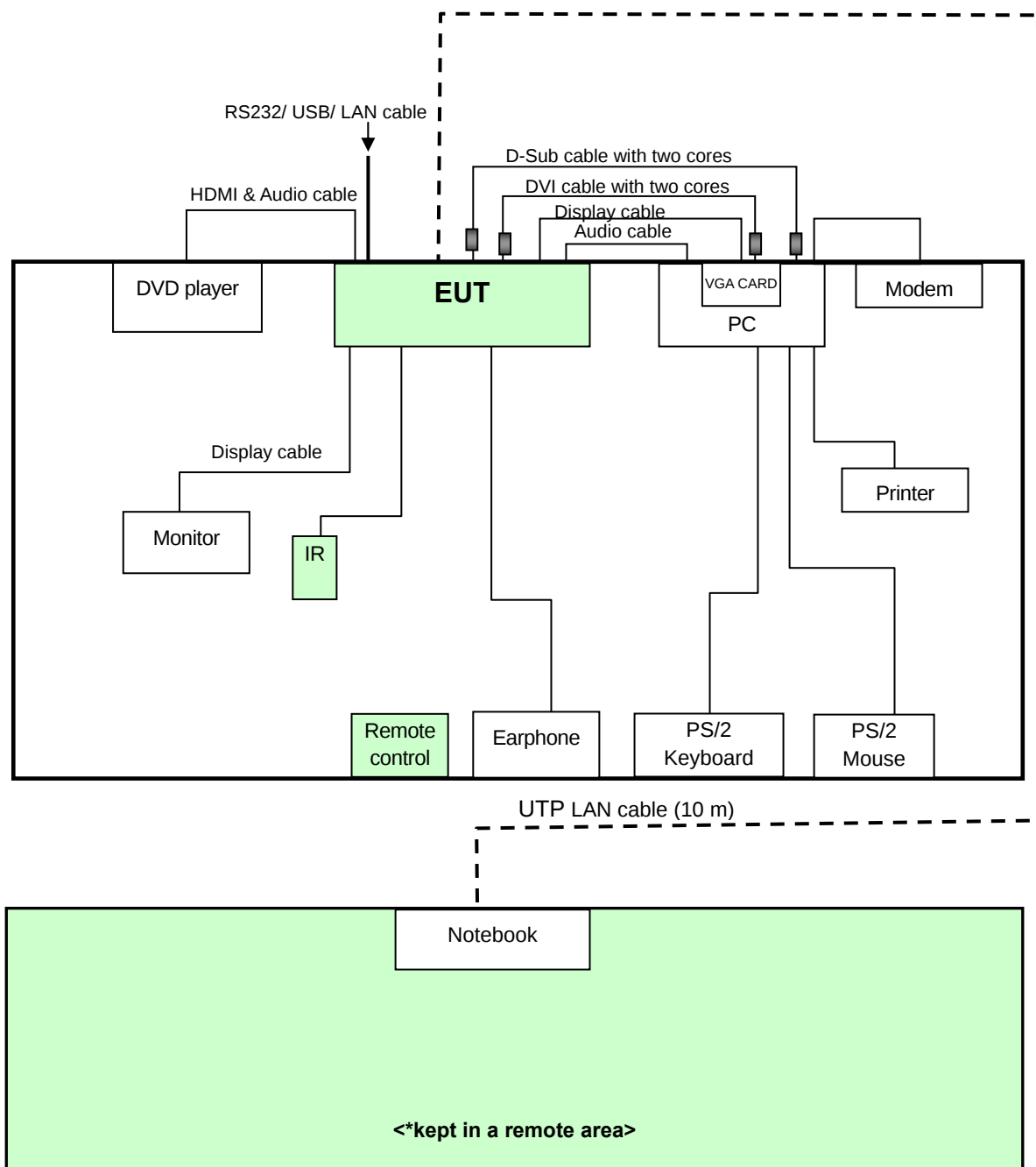
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	PERSONAL COMPUTER	HP	6000ProMT	SGH110SGNF	FCC DOC Approved
2	VGA CARD	MSI	MS-V279	602-V279-030B 1207067050	FCC Doc Approved
3	24" LCD MONITOR	DELL	U2410	CN082WXD728 720CC0KDL	Doc
4	PRINTER	LEXMARK	Z33	03331652570	FCC DoC Approved
5	MODEM	ACEEX	1414	0206026758	IFAXDM1414
6	DVD player	SONY	DVP-NS975V	2030567	Verification
7	EARPHONE	PHILIPS	SBC HL150	H2010148	N/A
8	PS/2 KEYBOARD	BTC	5200T	F24800345	E5XKB5122WTH01 10
9	PS/2 MOUSE	BTC	M851	M4010762	E5XMSM860
10	NOTEBOOK COMPUTER	DELL	PP04X	JV9ZZ1S	FCC DoC Approved

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	1.8 m shielded DVI cable with two cores, 1.8 m shielded Audio cable, 2.0 m shielded Display cable, 4.0 m shielded D-Sub cable with two cores <provided by client>
2	N/A
3	2.0 m shielded Display cable
4	2.0 m foil shielded wire, terminated with USB connector via metallic frame, w/o core.
5	1.2 m braid shielded wire, terminated with DB25 and DB9 connector via metallic frame, w/o core.
6	1.8 m shielded HDMI cable, 1.8 m shielded Audio cable
7	1.2 m wrapped shielded wire, terminated with 3.5mm phone plug via drain wire, w/o core.
8	1.6 m foil shielded wire, terminated with PS/2 connector via metallic frame, w/o core.
9	1.5 m Non shielded wire, terminated with PS/2 connector via drain wire, w/o core.
10	10 m UTP LAN cable

NOTE: (1) All power cords of the above support units are non shielded (1.8m).
(2) The support unit 2 was installed into support unit 1.
(3) One USB cable (1.8m) was connected to EUT to form an open loop cable.
(4) One RS-232 cable (1.8m) was connected to EUT to form an open loop cable.
(5) One LAN (1.8m) cable was connected to EUT to form an open loop cable.

TEST CONFIGURATION



4 EMISSION TEST

4.1 CONDUCTED EMISSION MEASUREMENT

4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

TEST STANDARD: FCC Part 15, Subpart B (Section: 15.107)

ICES-003:2012 Issue 5 (section: 6.1)

FREQUENCY (MHz)	Class A (dBuV)		Class B (dBuV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 - 0.5	79	66	66 - 56	56 - 46
0.50 - 5.0	73	60	56	46
5.0 - 30.0	73	60	60	50

NOTE: (1) The lower limit shall apply at the transition frequencies.
 (2) The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.

4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
ROHDE & SCHWARZ TEST RECEIVER	ESCS 30	100292	Dec. 13, 2012	Dec. 12, 2013
ROHDE & SCHWARZ Artificial Mains Network (for EUT)	ESH2-Z5	100104	Dec. 13, 2012	Dec. 12, 2013
LISN With Adapter (for EUT)	AD10	C09Ada-001	Dec. 13, 2012	Dec. 12, 2013
ROHDE & SCHWARZ Artificial Mains Network (for EUT)	ESH3-Z5	100220	Nov. 20, 2012	Nov. 19, 2013
ROHDE & SCHWARZ Artificial Mains Network (for peripherals)	ESH3-Z5	835239/002	Mar. 08, 2013	Mar. 07, 2014
Software	ADT_Cond_V7.3.7	NA	NA	NA
Software	ADT_ISN_V7.3.7	NA	NA	NA
RF cable (JYEBAO)	5D-FB	Cable-C09.01	Feb. 21, 2013	Feb. 20, 2014
SUHNTER Terminator (For ROHDE & SCHWARZ LISN)	65BNC-5001	E1-010789	May 23, 2013	May 22, 2014

- NOTE:**
1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
 2. The test was performed in Shielded Room No. 9.
 3. The VCCI Site Registration No. C-1312.
 4. Tested Date: Aug. 2, 2013.

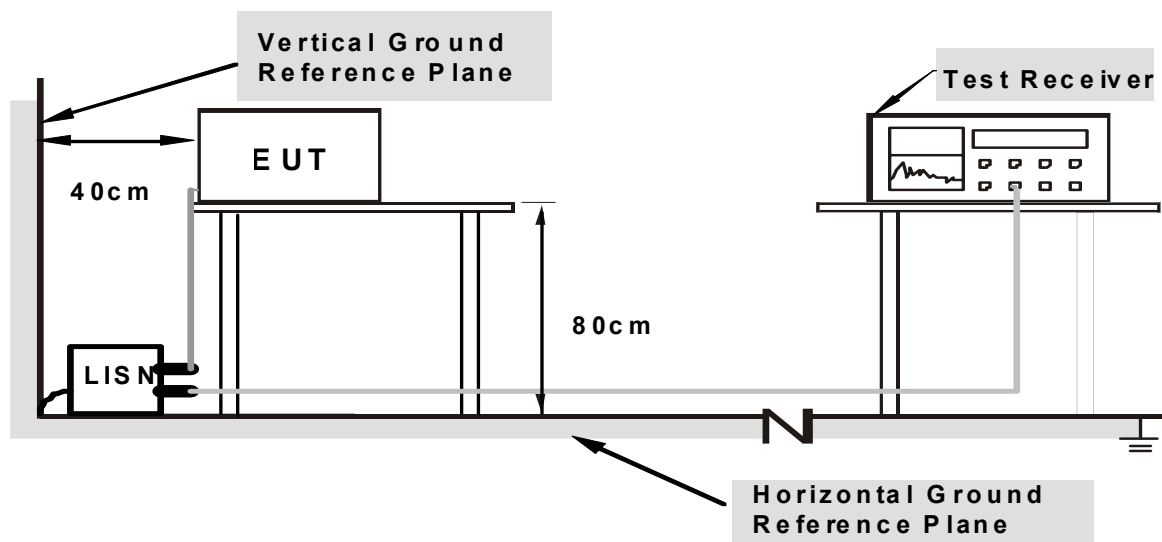
4.1.3 TEST PROCEDURE

- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- c. The frequency range from 150 kHz to 30 MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

4.1.4 DEVIATION FROM TEST STANDARD

No deviation

4.1.5 TEST SETUP



Note: Support units were connected to second LISN.

For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

4.1.6 EUT OPERATING CONDITIONS

- a. Turned on the power of all equipment.
- b. PC ran a test program (WinFCC) to enable all functions.
- c. PC read and wrote messages from HDD.
- d. Notebook (kept in a remote area) sent and received messages to/from EUT via an UTP LAN cable.
- e. PC sent "H" messages to EUT and ext. monitor via EUT, and then they displayed them on their screen. **<For Mode 1>**
- f. DVD player sent color bars to EUT and ext. monitor via EUT, and then they displayed them on their screen. **<For Mode 2>**
- g. PC sent messages to printer and printer printed them out.
- h. PC sent messages to modem.
- i. PC sent 1kHz audio signal to earphone via EUT. **<For Mode 1>**
- j. DVD player sent audio signal to earphone via EUT. **<For Mode 2>**
- k. Steps c-j were repeated.

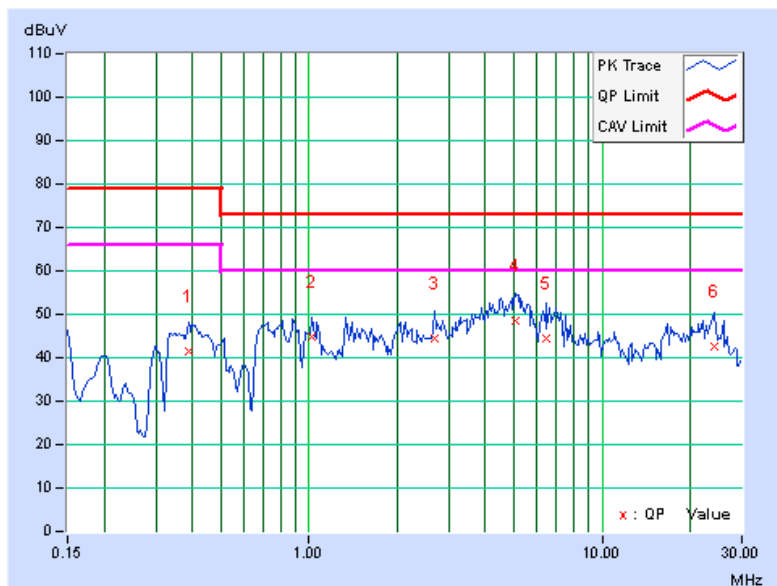
4.1.7 TEST RESULTS (1)

TEST MODE	Mode 1	6DB BANDWIDTH	9 kHz
INPUT POWER	120Vac, 60 Hz	PHASE	Line (L)
ENVIRONMENTAL CONDITIONS	26deg. C, 74% RH	TESTED BY: Justin Liu	

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
	[MHz]	(dB)	[dB (uV)]	[dB (uV)]	[dB (uV)]	[dB (uV)]	[dB (uV)]	[dB (uV)]	(dB)	(dB)
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.38828	0.23	41.31	31.99	41.54	32.22	79.00	66.00	-37.46	-33.78
2	1.02734	0.27	44.37	34.03	44.64	34.30	73.00	60.00	-28.36	-25.70
3	2.68359	0.36	43.90	35.06	44.26	35.42	73.00	60.00	-28.74	-24.58
4	5.08203	0.45	47.97	37.37	48.42	37.82	73.00	60.00	-24.58	-22.18
5	6.48438	0.49	44.10	32.12	44.59	32.61	73.00	60.00	-28.41	-27.39
6	24.05078	1.06	41.37	30.88	42.43	31.94	73.00	60.00	-30.57	-28.06

REMARKS:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission Level – Limit value
4. Correction Factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

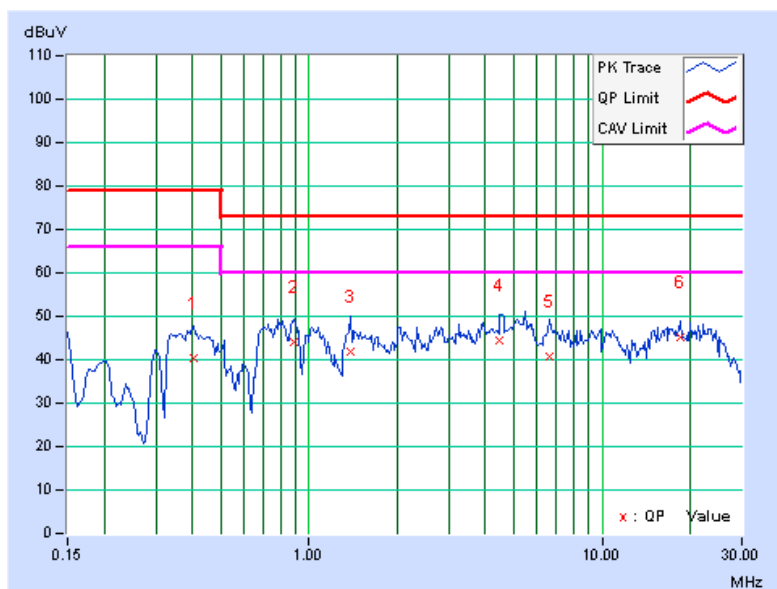


TEST MODE	Mode 1	6dB BANDWIDTH	9 kHz
INPUT POWER	120Vac, 60 Hz	PHASE	Neutral (N)
ENVIRONMENTAL CONDITIONS	26deg. C, 74% RH	TESTED BY: Justin Liu	

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.40391	0.31	40.01	31.26	40.32	31.57	79.00	66.00	-38.68	-34.43
2	0.88828	0.35	43.56	33.36	43.91	33.71	73.00	60.00	-29.09	-26.29
3	1.38281	0.39	41.53	31.02	41.92	31.41	73.00	60.00	-31.08	-28.59
4	4.45703	0.53	43.91	34.14	44.44	34.67	73.00	60.00	-28.56	-25.33
5	6.64063	0.57	40.06	30.36	40.63	30.93	73.00	60.00	-32.37	-29.07
6	18.49219	0.78	44.43	31.51	45.21	32.29	73.00	60.00	-27.79	-27.71

REMARKS:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission Level – Limit value
4. Correction Factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value



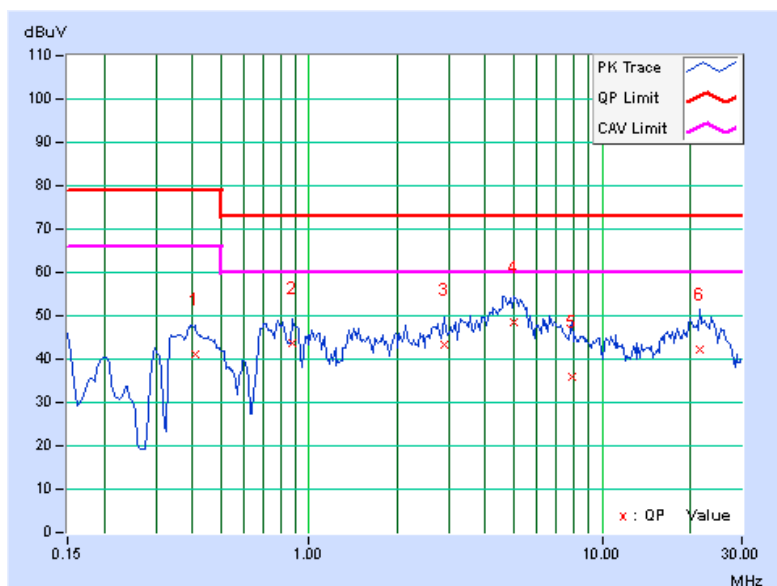
4.1.8 TEST RESULTS (2)

TEST MODE	Mode 2	6DB BANDWIDTH	9 kHz
INPUT POWER	120Vac, 60 Hz	PHASE	Line (L)
ENVIRONMENTAL CONDITIONS	26deg. C, 74% RH	TESTED BY: Justin Liu	

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.40781	0.23	40.78	31.42	41.01	31.65	79.00	66.00	-37.99	-34.35
2	0.87266	0.26	43.40	31.72	43.66	31.98	73.00	60.00	-29.34	-28.02
3	2.88281	0.37	42.84	31.80	43.21	32.17	73.00	60.00	-29.79	-27.83
4	5.00391	0.45	48.24	34.37	48.69	34.82	73.00	60.00	-24.31	-25.18
5	7.86328	0.52	35.45	28.17	35.97	28.69	73.00	60.00	-37.03	-31.31
6	21.65625	1.01	41.15	31.77	42.16	32.78	73.00	60.00	-30.84	-27.22

REMARKS:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission Level – Limit value
4. Correction Factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

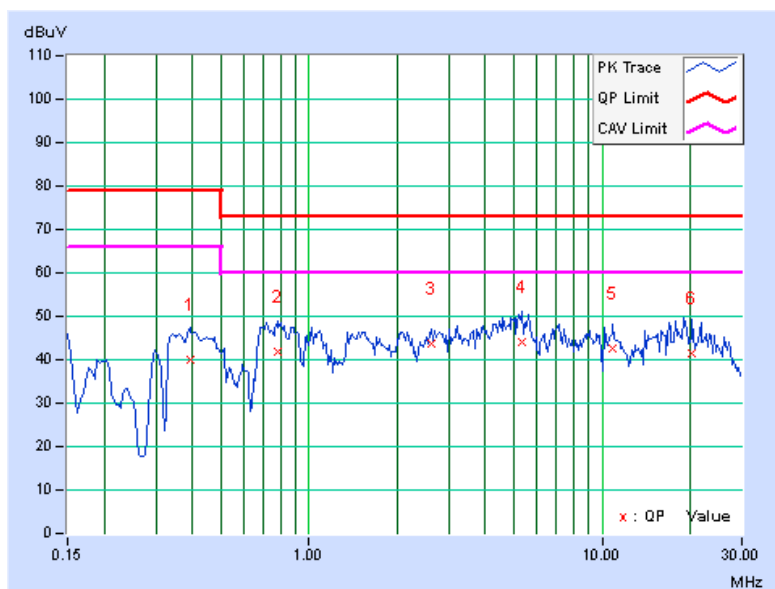


TEST MODE	Mode 2	6dB BANDWIDTH	9 kHz
INPUT POWER	120Vac, 60 Hz	PHASE	Neutral (N)
ENVIRONMENTAL CONDITIONS	26deg. C, 74% RH	TESTED BY: Justin Liu	

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.39219	0.31	39.67	31.32	39.98	31.63	79.00	66.00	-39.02	-34.37
2	0.78281	0.34	41.42	32.44	41.76	32.78	73.00	60.00	-31.24	-27.22
3	2.61719	0.46	43.17	33.37	43.63	33.83	73.00	60.00	-29.37	-26.17
4	5.32825	0.55	43.51	34.68	44.06	35.23	73.00	60.00	-28.94	-24.77
5	10.83594	0.65	42.11	35.00	42.76	35.65	73.00	60.00	-30.24	-24.35
6	20.29297	0.80	40.50	30.50	41.30	31.30	73.00	60.00	-31.70	-28.70

REMARKS:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission Level – Limit value
4. Correction Factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value



4.2 RADIATED EMISSION MEASUREMENT

4.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

TEST STANDARD: FCC Part 15, Subpart B (Section: 15.109)

ICES-003:2012 Issue 5 (section: 6.2)

Emissions radiated outside of the specified bands, shall be according to the general radiated limits as following:

Radiated Emissions Limits at 10 meters (dBµV/m)				
Frequencies (MHz)	FCC 15B/ ICES-003, Class A	FCC 15B / ICES-003, Class B	CISPR 22, Class A	CISPR 22, Class B
30-88	39	29.5	40	30
88-216	43.5	33.1		
216-230	46.4	35.6		
230-960			47	37
960-1000	49.5	43.5		
1000-3000	Avg: 49.5	Avg: 43.5	Not defined	Not defined
Above 3000	Peak: 69.5	Peak: 63.5	Not defined	Not defined

Radiated Emissions Limits at 3 meters (dBμV/m)				
Frequencies (MHz)	FCC 15B / ICES-003, Class A	FCC 15B / ICES-003, Class B	CISPR 22, Class A	CISPR 22, Class B
30-88	49.5	40	50.5	40.5
88-216	54	43.5		
216-230	56.9	46		
230-960				
960-1000	60	54	57.5	47.5
1000-3000	Avg: 60 Peak: 80	Avg: 54 Peak: 74	Avg: 56 Peak: 76	Avg: 50 Peak: 70
Above 3000			Avg: 60 Peak: 80	Avg: 54 Peak: 74

- NOTE:**
1. The lower limit shall apply at the transition frequencies.
 2. Emission level (dB μ V/m) = 20 log Emission level (uV/m).
 3. As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.
 4. QP detector shall be applied if not specified.

FREQUENCY RANGE OF RADIATED MEASUREMENT (For unintentional radiators)

Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement Range (MHz)
Below 1.705	30
1.705 – 108	1000
108 – 500	2000
500 – 1000	5000
Above 1000	5 th harmonic of the highest frequency or 40 GHz, whichever is lower

4.2.2 TEST INSTRUMENTS

Frequency Range 30MHz~1GHz

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Agilent Preamplifier	8447D	2944A11062	Feb. 27, 2013	Feb. 26, 2014
Agilent Preamplifier	8447D	2944A11064	Feb. 27, 2013	Feb. 26, 2014
Agilent Test Receiver	N9038A	MY50010158	Apr. 09, 2013	Apr. 08, 2014
Agilent Test Receiver	N9038A	MY51210114	Apr. 09, 2013	Apr. 08, 2014
Schwarzbeck Antenna	VULB9168	9168-316	Mar. 25, 2013	Mar. 24, 2014
Schwarzbeck Antenna	VULB9168	9168-317	Mar. 25, 2013	Mar. 24, 2014
Max Full. Turn Table & Tower	MF7802	MF7802121	NA	NA
Max Full. Tower	MF7802	MF780208105	NA	NA
Software	ADT_Radiated_V8.7.07	NA	NA	NA
WOKEN RF cable	8D	CABLE-CH8-01.V	Dec. 19, 2012	Dec. 18, 2013
JYE BAO RF cable	8D	CABLE-CH8-02.H	Dec. 19, 2012	Dec. 18, 2013
JYE BAO RF cable	8D	CABLE-CH8-03.3M	Dec. 19, 2012	Dec. 18, 2013

NOTE: 1. The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to NML/ROC and NIST/USA.
 2. The test was performed in Chamber No. 8.
 3. The Industry Canada Reference No. IC 7450E-8.
 4. The VCCI Site Registration No. R-2946
 5. The FCC Site Registration No. 493821.
 6. Tested Date: Aug. 1, 2013.

Frequency Range above 1GHz

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Agilent Spectrum	E4446A	MY51100009	Jun. 21, 2013	Jun. 20, 2014
Agilent Test Receiver	N9038A	MY51210114	Apr. 09, 2013	Apr. 08, 2014
Agilent Preamplifier	8449B	3008A01924	Feb. 27, 2013	Feb. 26, 2014
MITEQ Preamplifier	AMF-6F-260400-33-8P	892164	Mar. 01, 2013	Feb. 28, 2014
Schwarzbeck Horn Antenna	BBHA-9170	BBHA9170190	Oct. 04, 2012	Oct. 03, 2013
ETS Horn Antenna	3117	00123980	Jan. 07, 2013	Jan. 06, 2014
Max Full. Turn Table	MF7802	MF7802121	NA	NA
Max Full. Tower	MF7802	MF780208105	NA	NA
Software	ADT_Radiated_V8.7.07	NA	NA	NA
SUHNER RF cable	SF106-18	Cable-CH8	Aug. 19, 2012	Aug. 18, 2013
SUHNER RF cable	SF102	Cable-CH8-3.6m	Aug. 19, 2012	Aug. 18, 2013

NOTE: 1. The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Chamber No. 8.
3. The Industry Canada Reference No. IC 7450E-8.
4. The VCCI Site Registration No. G-19
5. The FCC Site Registration No. 493821.
6. Tested Date: Aug. 2, 2013.

4.2.3 TEST PROCEDURE

<Frequency Range 30MHz ~ 1GHz>

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 10 meter Semi-anechoic chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the turn table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.

NOTE: The resolution bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.

<Frequency Range above 1GHz>

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 10 meter Semi-anechoic chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna can be varied from one meter to four meters, the height of adjustment depends on the EUT height and the antenna 3dB beamwidth both, to detect the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz.

NOTE:

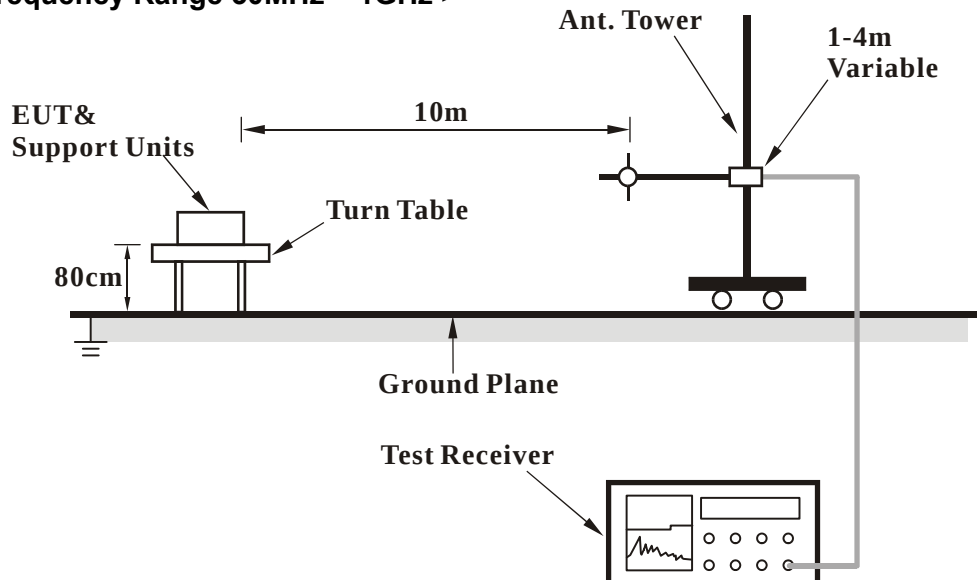
1. The resolution bandwidth is 1MHz and video bandwidth of test receiver/spectrum analyzer is 3MHz for Peak detection at frequency above 1GHz. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz for Average detection (AV) at frequency above 1GHz.
2. For measurement of frequency above 1000 MHz, the EUT was set 3 meters away from the receiver antenna.

4.2.4 DEVIATION FROM TEST STANDARD

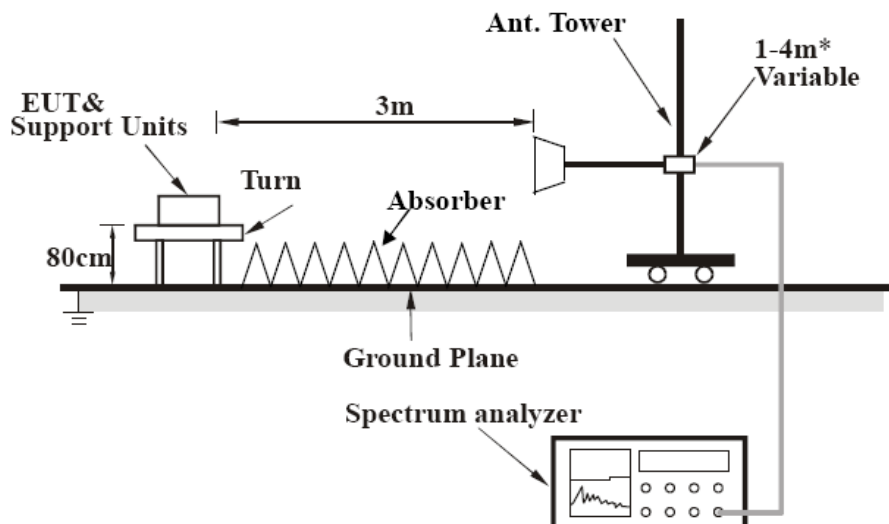
No deviation

4.2.5 TEST SETUP

<Frequency Range 30MHz ~ 1GHz >



<Frequency Range above 1GHz>



* depends on the EUT height and the antenna 3dB beamwidth both.

For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

4.2.6 EUT OPERATING CONDITIONS

Same as item 4.1.6

4.2.7 TEST RESULTS (1)

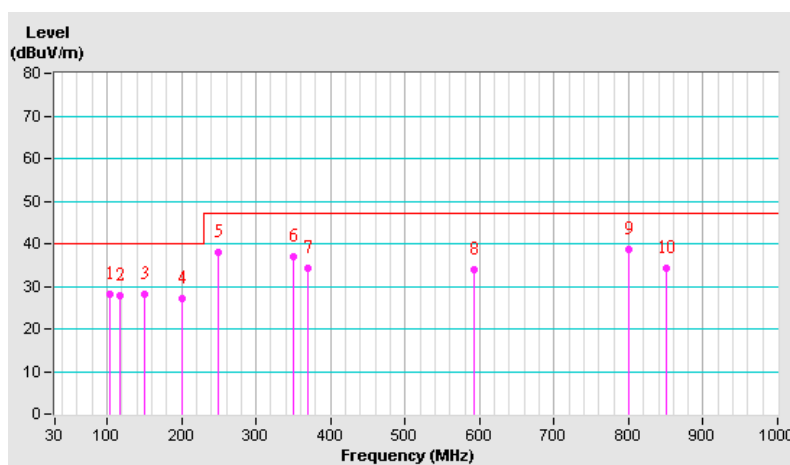
TEST MODE	Mode 1		
FREQUENCY RANGE	30-1000 MHz	DETECTOR FUNCTION & RESOLUTION BANDWIDTH	Quasi-Peak, 120 kHz
ENVIRONMENTAL CONDITIONS	25deg. C, 65% RH	TESTED BY: Ken Lee	

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 10 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	103.67	28.24 QP	40.00	-11.76	3.56 H	9	44.86	-16.62
2	116.81	27.75 QP	40.00	-12.25	3.71 H	322	42.77	-15.02
3	149.99	28.13 QP	40.00	-11.87	3.88 H	151	40.63	-12.50
4	201.25	27.18 QP	40.00	-12.82	3.62 H	9	42.28	-15.10
5	250.00	38.04 QP	47.00	-8.96	3.44 H	264	50.44	-12.40
6	350.00	36.92 QP	47.00	-10.08	2.37 H	285	46.26	-9.34
7	369.89	34.18 QP	47.00	-12.82	2.11 H	58	42.88	-8.70
8	593.23	33.93 QP	47.00	-13.07	1.09 H	295	37.87	-3.94
9	799.99	38.70 QP	47.00	-8.30	1.00 H	240	38.44	0.26
10	850.04	34.20 QP	47.00	-12.80	3.04 H	8	33.10	1.10

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value



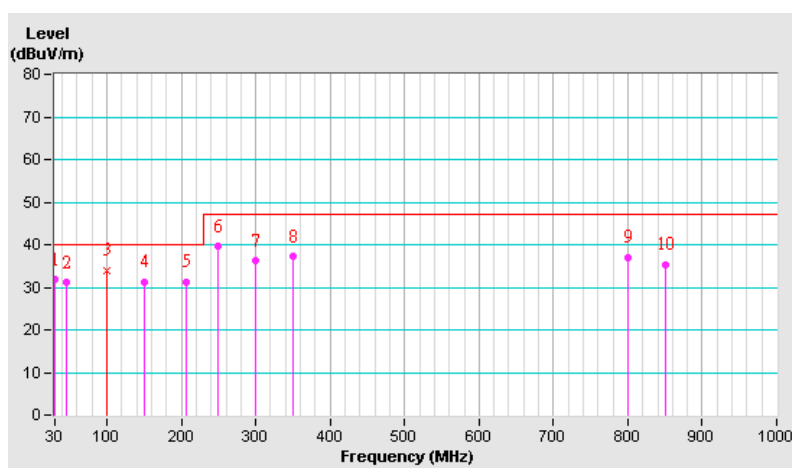
TEST MODE	Mode 1		
FREQUENCY RANGE	30-1000 MHz	DETECTOR FUNCTION & RESOLUTION BANDWIDTH	Quasi-Peak, 120 kHz
ENVIRONMENTAL CONDITIONS	25deg. C, 65% RH	TESTED BY: Ken Lee	

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 10 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	30.00	31.72 QP	40.00	-8.28	3.62 V	38	45.76	-14.04
2	46.39	31.05 QP	40.00	-8.95	1.72 V	91	43.57	-12.52
3	100.65	33.89 QP	40.00	-6.11	1.23 V	314	50.33	-16.44
4	150.09	31.19 QP	40.00	-8.81	2.09 V	312	43.04	-11.85
5	207.32	31.28 QP	40.00	-8.72	3.79 V	283	45.64	-14.36
6	250.00	39.50 QP	47.00	-7.50	1.14 V	123	51.37	-11.87
7	300.00	36.18 QP	47.00	-10.82	1.03 V	85	46.07	-9.89
8	350.00	37.15 QP	47.00	-9.85	3.96 V	130	46.31	-9.16
9	799.99	36.97 QP	47.00	-10.03	2.43 V	291	36.74	0.23
10	849.99	35.41 QP	47.00	-11.59	1.52 V	115	34.34	1.07

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value



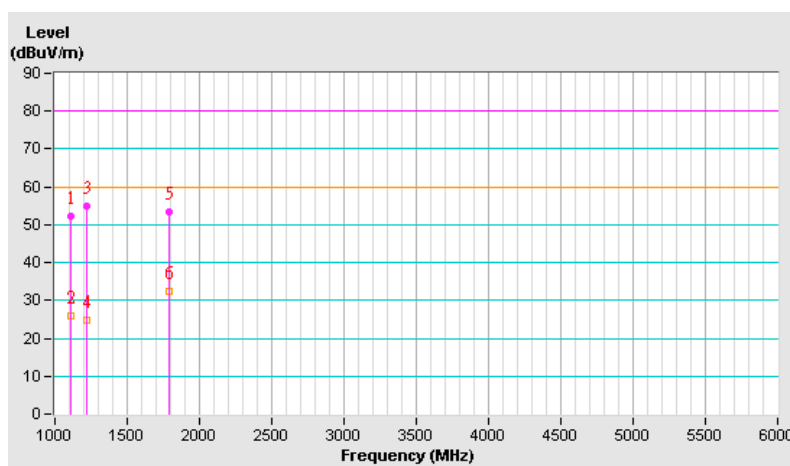
TEST MODE	Mode 1		
FREQUENCY RANGE	1-6 GHz	DETECTOR FUNCTION & RESOLUTION BANDWIDTH	Peak/Average, 1MHz
ENVIRONMENTAL CONDITIONS	26deg. C, 66% RH	TESTED BY: Ken Lee	

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1108.57	52.28 PK	80.00	-27.72	1.18 H	89	59.53	-7.25
2	1108.57	26.02 AV	60.00	-33.98	1.18 H	89	33.27	-7.25
3	1216.63	54.75 PK	80.00	-25.25	1.12 H	71	61.63	-6.88
4	1216.63	24.89 AV	60.00	-35.11	1.12 H	71	31.77	-6.88
5	1790.48	53.47 PK	80.00	-26.53	1.05 H	132	57.09	-3.62
6	1790.48	32.51 AV	60.00	-27.49	1.05 H	132	36.13	-3.62

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value





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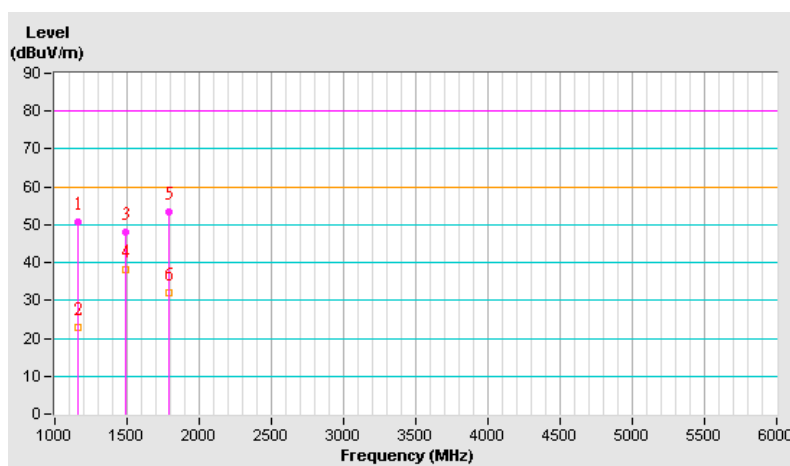
TEST MODE	Mode 1		
FREQUENCY RANGE	1-6GHz	DETECTOR FUNCTION & RESOLUTION BANDWIDTH	Peak/Average, 1MHz
ENVIRONMENTAL CONDITIONS	26deg. C, 66% RH	TESTED BY: Ken Lee	

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1162.95	50.65 PK	80.00	-29.35	1.73 V	1	57.72	-7.07
2	1162.95	22.76 AV	60.00	-37.24	1.73 V	1	29.83	-7.07
3	1485.05	48.18 PK	80.00	-31.82	1.10 V	185	54.30	-6.12
4	1485.05	38.19 AV	60.00	-21.81	1.10 V	185	44.31	-6.12
5	1790.50	53.31 PK	80.00	-26.69	1.16 V	141	56.93	-3.62
6	1790.50	31.88 AV	60.00	-28.12	1.16 V	141	35.50	-3.62

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value



4.2.8 TEST RESULTS (2)

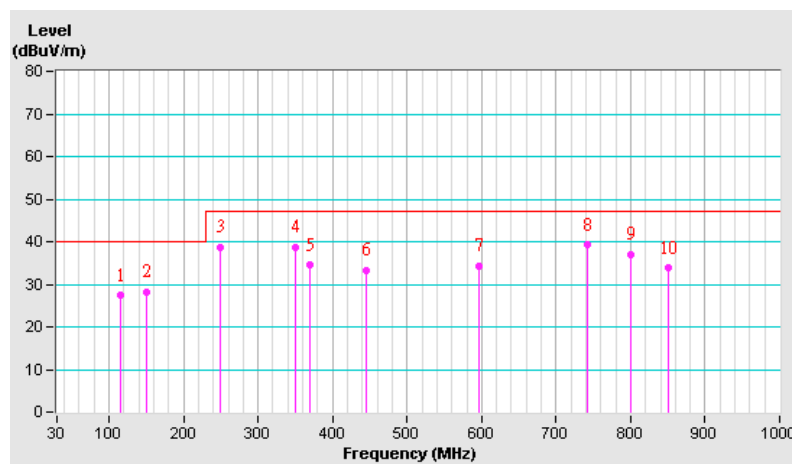
TEST MODE	Mode 2		
FREQUENCY RANGE	30-1000 MHz	DETECTOR FUNCTION & RESOLUTION BANDWIDTH	Quasi-Peak, 120 kHz
ENVIRONMENTAL CONDITIONS	25deg. C, 65% RH	TESTED BY: Ken Lee	

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 10 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	115.41	27.32 QP	40.00	-12.68	3.92 H	321	42.65	-15.33
2	149.99	28.26 QP	40.00	-11.74	3.78 H	160	40.76	-12.50
3	250.00	38.69 QP	47.00	-8.31	3.46 H	273	51.09	-12.40
4	350.00	38.69 QP	47.00	-8.31	2.68 H	285	48.03	-9.34
5	369.26	34.46 QP	47.00	-12.54	2.13 H	61	43.18	-8.72
6	445.06	33.24 QP	47.00	-13.76	2.28 H	296	40.20	-6.96
7	595.80	34.39 QP	47.00	-12.61	1.07 H	289	38.20	-3.81
8	741.74	39.18 QP	47.00	-7.82	1.10 H	324	39.85	-0.67
9	799.99	36.96 QP	47.00	-10.04	1.23 H	276	36.70	0.26
10	849.99	33.76 QP	47.00	-13.24	3.08 H	7	32.66	1.10

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value



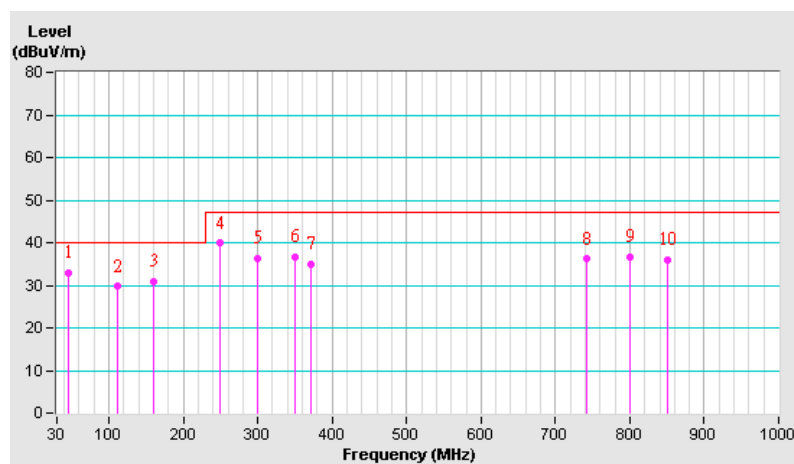
TEST MODE	Mode 2		
FREQUENCY RANGE	30-1000 MHz	DETECTOR FUNCTION & RESOLUTION BANDWIDTH	Quasi-Peak, 120 kHz
ENVIRONMENTAL CONDITIONS	25deg. C, 65% RH	TESTED BY: Ken Lee	

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 10 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	46.34	32.92 QP	40.00	-7.08	1.14 V	64	45.42	-12.50
2	112.16	29.69 QP	40.00	-10.31	2.07 V	343	44.68	-14.99
3	159.74	30.77 QP	40.00	-9.23	1.63 V	329	42.38	-11.61
4	250.00	39.87 QP	47.00	-7.13	1.19 V	130	51.74	-11.87
5	300.00	36.36 QP	47.00	-10.64	1.02 V	77	46.25	-9.89
6	350.00	36.54 QP	47.00	-10.46	1.47 V	139	45.70	-9.16
7	371.25	34.88 QP	47.00	-12.12	1.23 V	113	43.30	-8.42
8	741.74	36.14 QP	47.00	-10.86	2.08 V	101	36.59	-0.45
9	799.99	36.74 QP	47.00	-10.26	2.43 V	287	36.51	0.23
10	849.99	35.90 QP	47.00	-11.10	1.57 V	114	34.83	1.07

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value





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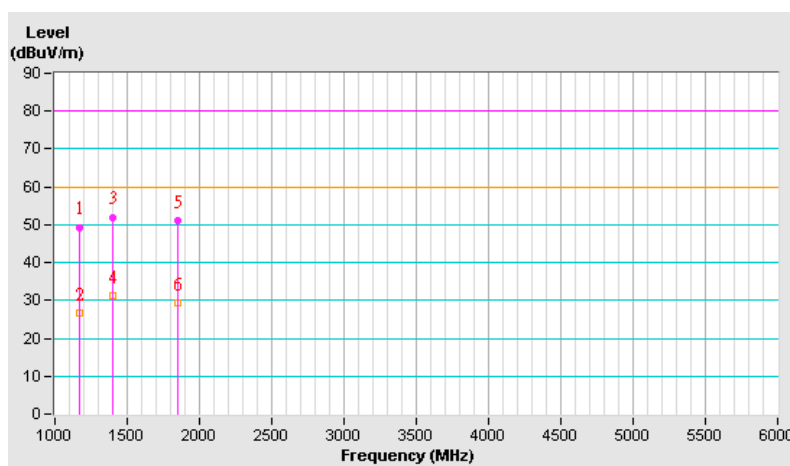
TEST MODE	Mode 2		
FREQUENCY RANGE	1-6 GHz	DETECTOR FUNCTION & RESOLUTION BANDWIDTH	Peak/Average, 1MHz
ENVIRONMENTAL CONDITIONS	26deg. C, 66% RH	TESTED BY: Ken Lee	

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1168.58	49.36 PK	80.00	-30.64	1.29 H	150	56.42	-7.06
2	1168.58	26.72 AV	60.00	-33.28	1.29 H	150	33.78	-7.06
3	1402.86	52.02 PK	80.00	-27.98	1.04 H	144	58.26	-6.24
4	1402.86	31.09 AV	60.00	-28.91	1.04 H	144	37.33	-6.24
5	1845.75	51.19 PK	80.00	-28.81	1.32 H	134	54.38	-3.19
6	1845.75	29.51 AV	60.00	-30.49	1.32 H	134	32.70	-3.19

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

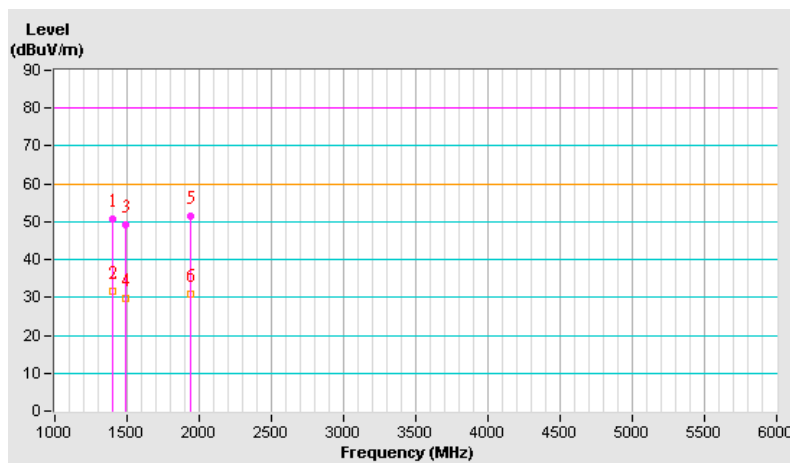


TEST MODE	Mode 2		
FREQUENCY RANGE	1-6 GHz	DETECTOR FUNCTION & RESOLUTION BANDWIDTH	Peak/Average, 1MHz
ENVIRONMENTAL CONDITIONS	25deg. C, 70% RH	TESTED BY: Vincent Chen	

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1402.75	50.81 PK	80.00	-29.19	1.16 V	231	57.05	-6.24
2	1402.75	31.54 AV	60.00	-28.46	1.16 V	231	37.78	-6.24
3	1490.49	49.05 PK	80.00	-30.95	1.00 V	146	55.17	-6.12
4	1490.49	29.82 AV	60.00	-30.18	1.00 V	146	35.94	-6.12
5	1937.74	51.34 PK	80.00	-28.66	1.39 V	147	53.81	-2.47
6	1937.74	30.89 AV	60.00	-29.11	1.39 V	147	33.36	-2.47

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value



5 PHOTOGRAPHS OF THE TEST CONFIGURATION

CONDUCTED EMISSION TEST – For Mode 1



CONDUCTED EMISSION TEST – For Mode 2



RADIATED EMISSION TEST – For Mode 1 (Frequency Range 30MHz ~ 1GHz)



RADIATED EMISSION TEST – For Mode 1 (Frequency Range above 1GHz)



RADIATED EMISSION TEST – For Mode 2 (Frequency Range 30MHz ~ 1GHz)



RADIATED EMISSION TEST – For Mode 2 (Frequency Range above 1GHz)



6 INFORMATION ON THE TESTING LABORATORIES

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

Linko EMC/RF Lab:

Tel: 886-2-26052180

Fax: 886-2-26051924

Hsin Chu EMC/RF Lab:

Tel: 886-3-5935343

Fax: 886-3-5935342

Hwa Ya EMC/RF/Safety/Telecom Lab:

Tel: 886-3-3183232

Fax: 886-3-3270892

Email: service.adt@tw.bureauveritas.com

Web Site: www.bureauveritas-adt.com

The address and road map of all our labs can be found in our web site also.

7 APPENDIX A – MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No modifications were made to the EUT by the lab during the test.

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